



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/611,555	07/01/2003	Naoya Hasegawa	9281-4590	5023

7590 12/15/2004

Brinks Hofer Gilson & Lione  
P.O. Box 10395  
Chicago, IL 60610

EXAMINER
----------

BERNATZ, KEVIN M

ART UNIT	PAPER NUMBER
----------	--------------

1773

DATE MAILED: 12/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/611,555

**Applicant(s)**

HASEGAWA ET AL.

**Examiner**

Kevin M Bernatz

**Art Unit**

1773

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-39 is/are pending in the application.  
4a) Of the above claim(s) 21-39 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,4,9-12,14-17,19 and 20 is/are rejected.
- 7) ☒ Claim(s) 2,3,5-8,13 and 18 is/are objected to.
- 8) ☒ Claim(s) 1-39 are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 7/1/03 + 11/24/03.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Examiner's Comments*

1. Regarding the limitation(s) "first" and "second" free magnetic layers in claims 1 - 20, the Examiner has given the term(s) the broadest reasonable interpretation(s) consistent with the written description in applicants' specification as it would be interpreted by one of ordinary skill in the art. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997). See MPEP 2111. Specifically, the Examiner has interpreted that a single free magnetic layer can be construed to have a "first" and a "second" layer part if the two parts of the free magnetic layer behave differently. Applicants are suggested to positively recite that the second ferromagnetic layer is *distinct* from the first ferromagnetic layer should applicants desire to exclude single layers possessing multiple "free magnetic elements".

### *Election/Restrictions*

2. Applicant's election of Group I, claims 1 - 20 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). Claims 21 - 39 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. The requirement is still deemed proper and is therefore made FINAL.

***Claim Objections***

3. Claims 2, 3, 5 - 8, 13 and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 14 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 14 recites the limitation "in a space dividing the antiferromagnetic layer in the track width direction above the second free magnetic layer", yet it is unclear exactly what antiferromagnetic layer applicants are referring to since none of the antiferromagnetic layers possess a "space" in the track width direction above the second free magnetic layer. For purposes of evaluating the prior art, the Examiner has interpreted claim 14 to recite: wherein the third antiferromagnetic layer possesses a space in the track width direction dividing the third antiferromagnetic layer in the track width direction above the second free magnetic layer and wherein a nonmagnetic layer is in said space.

Claim 20 recites the limitation "the upper electrode layer" in line 2. There is insufficient antecedent basis for this limitation in the claim since claim 11 does not recite an "upper electrode". This rejection can be overcome by changing "the upper" to "an upper".

### ***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1, 4, 9 – 12, 15 – 17 and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by Zheng et al. (U.S. Patent App. No. 2004/0196598 A1).

Regarding claim 1, Zheng et al. disclose a magnetic detecting element (*Title*) comprising a multilayer laminate including a first antiferromagnetic (AFM) layer (*Figure 6, element 18*), a pinned magnetic layer (*elements 15 – 17*), a nonmagnetic material layer (*element 14*), and a first free magnetic layer (*part of element 13 within track width spacing of elements 14 – 18, 25*) in that order from the bottom (*i.e. top of Figure 6*) thereof, a second AFM layer disposed in the track width direction (*elements 23*) at each

Art Unit: 1773

side of the multilayer laminate in the track width direction, and a second free magnetic layer (part of element 13 outside the track width spacing of elements 14 – 18, 25 – See Figure I below) from the upper surface of the second AFM layer to the upper surface of the first free magnetic layer. The Examiner notes that the portions deemed to read on the limitation “second free magnetic layer” are disposed above longitudinal biasing means unlike the “first free magnetic layer” region and therefore behave in a substantially distinct manner from the “first free magnetic layer” region.

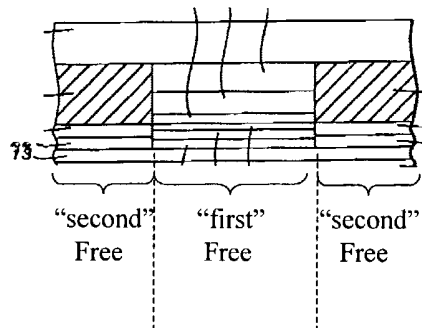


Figure I: illustration of “first” and “second” free layers (element 13)

Regarding claim 4, Zheng et al. disclose a ferromagnetic layer between the second AFM and the “second” free magnetic layer (*element 22*).

Regarding claims 9 and 10, Zheng et al. disclose “backed layers” meeting applicants claimed material and structural limitations (*element 66*).

Regarding claims 11 and 12, Zheng et al. disclose AFM and FM layers meeting applicants’ claimed structural limitations (*elements 65 and 68*).

Regarding claim 15, Zheng et al. disclose forming the multilayer laminate at an angle of 90° (*Figures*).

Regarding claims 16 and 17, Zheng et al. disclose electrode layers meeting applicants' claimed limitations (*Paragraphs 0032 – 0038*).

Regarding claim 19, Zheng et al. disclose CoFeB layers (i.e. applicants' "insulating layer") located between the upper electrode and the second free magnetic layer (*elements 65 and 67 and Paragraph 0038*). The Examiner notes that CoFeB has a conductivity less than the electrode layers (*Cu or Au – Paragraph 0038*) and is therefore deemed an "insulating layer" relative to the electrode layers.

8. Claims 1, 9 – 11, 14, 16 and 17 are rejected under 35 U.S.C. 102(a), 102(b) and 102(e) as being anticipated by Umetsu (U.S. Patent App. No. 2002/0036878 A1) – and

–

9. Claims 1, 9 – 11, 14, 16 and 17 are rejected under 35 U.S.C. 102(a) as being anticipated by Umetsu (JP 2002-111095 A). See Umetsu ('878 A1), which is the U.S. equivalent of JP '095A.

Regarding claim 1, Umetsu discloses a magnetic detecting element (*Title*) comprising a multilayer laminate including a first antiferromagnetic (AFM) layer (*Figure 1, element 2*), a pinned magnetic layer (*element 3*), a nonmagnetic material layer (*element 4*), and a first free magnetic layer (*element 5*) in that order from the bottom thereof, a second AFM layer disposed in the track width direction (*elements 6*) at each side of the multilayer laminate in the track width direction, and a second free magnetic layer (*element 8*) from the upper surface of the second AFM layer to the upper surface of the first free magnetic layer.

Regarding claims 9 and 10, Umetsu discloses "backed layers" meeting applicants claimed material and structural limitations (*element 9 and Paragraph 0028*).

Regarding claim 11, Umetsu discloses a third AFM layer meeting applicants' claimed structural limitations (*element 7*).

Regarding claim 14, Umetsu discloses a nonmagnetic layer (*element 12*) between a space in the track width direction made by the third AFM layers (*elements 7*).

Regarding claims 16 and 17, Umetsu discloses electrode layers meeting applicants' claimed limitations (*elements 9 and 10*).

### ***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Umetsu as applied above, and further in view of Komuro et al. (U.S. Patent App. No. 2002/0097536 A1).

Umetsu is relied upon as described above.

Umetsu fails to disclose the angle of the multilayer element, though Umetsu clearly teaches forming the laminate at an angle (*Figures*).



However, Komuro et al. teach that when multilayer laminates comprising a free, non-magnetic and pinned magnetic layer are formed in MR heads, that the preferred angles are 50 – 80 degrees (*Paragraph 0048*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Umetsu to utilize an angle meeting applicants' claimed limitations as taught by Komuro et al. since such angles are known preferred angles for forming the multilayer element for use in MR heads.

### ***Conclusion***

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M Bernatz whose telephone number is (571) 272-1505. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on (571) 272-1535. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Kevin M. Bernatz, PhD.  
Primary Examiner

December 10, 2004